EUROSTER 11K

MANUFACTURER: P.H.P.U. AS, Polanka 8a/3, 61-131 Poznań, POLAND

1. FIELD OF APPLICATION

EUROSTER 11K universal controller for water jacket fireplace central heating systems is equipped with switched 230 VAC outputs to connect the following system elements:

- electrically controlled actuator of the fireplace combustion air throttle
- plate heat exchanger water circulation pump
- CH (central heating) system water circulation/buffer tank pump
- DWH (domestic hot water) tank pump

and universal voltage-free contacts that may be used to turn on/off:

- alternative heat source (e.g. a gas-fired boiler).

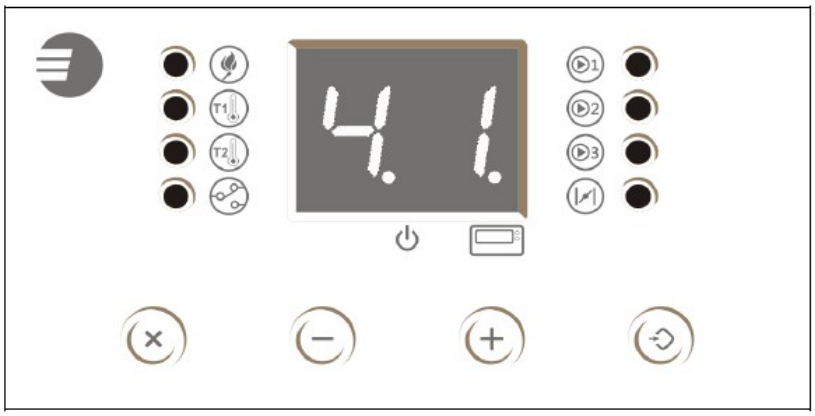
The controller may control systems built according to one of the three following layouts:

- CH system with a plate heat exchanger
- CH system with a heat buffer
- CH system with a plate heat exchanger and a DWH tank.

In all layouts the controller adjusts the combustion processes by opening/closing the fireplace throttle depending on the measured temperatures and information received from the cooperating room thermostat. An alternative heat source (e.g. a gas-fired boiler) may also be turned on depending on the temperatures and the information.

The EUROSTER 11K controller features the **ANTY-STOP** function that prevents idle pump rotors and valves against seizing. Once the heating season is over, every 14 days the function will automatically turn the pumps and the valves on for 30 seconds. To that end the controller must be left powered up.

2. VISIBLE CONTROLLER ELEMENTS



Lights Light ON means

1. – ignition function ON
2. / – 1st/2nd sensor temperature reading displayed
3. –alternative heat source ON
4. , , – 1st/2nd/3rd pump ON
5. – throttle open
6. – room thermostat signal hooked up
7. – controller power ON

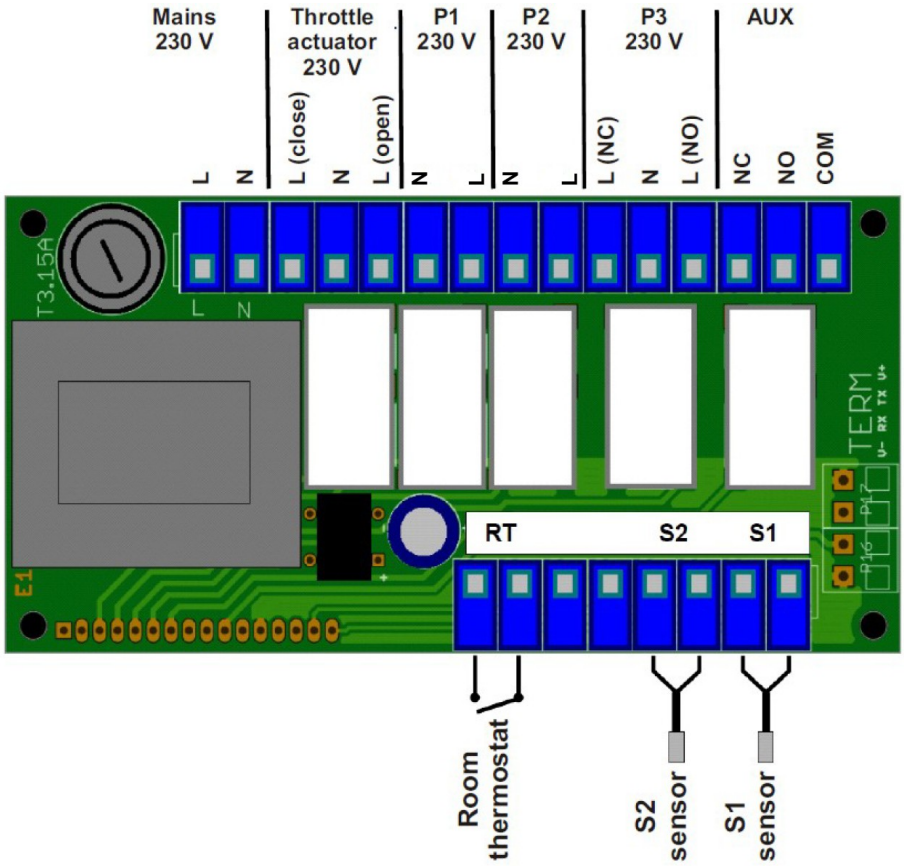
Button functions

1. – exit, cancel, turn the controller off
2. – decrement the displayed value, turn the ignition off
3. – increment the displayed value, turn the ignition on
4. – accept the displayed value, turn the controller on, enter the setup mode.

3. INSTALLATION

ATTENTION Hazardous voltages may be present inside the controller and on its cables. Therefore it is expressly forbidden to install the device unless its mains power supply is disconnected. Only qualified technicians may install the controller. Do not install any device showing signs of any mechanical damage.

Controller terminals:



ATTENTION The controller must not be installed in a place where ambient temperature may exceed 40°C.

ATTENTION The controller is equipped with an electronic power supply switch, which does not guarantee safe isolation of power in all circumstances. In particular, if some sensor wires are disconnected or short circuited during assembly works, hazardous voltages may appear on some controller outputs. Therefore the controller power supply cord must be unplugged before any works are started.

The procedure:

a) Mount the S1 sensor:

- do not immerse the sensor into any liquid nor install it within chimney flue gas stream
- install sensor at some external surface of the fireplace water jacket or on an uncovered segment of the fireplace outlet pipe (as close to the fireplace as possible)
- using a hose clip tighten the sensor to its pipe.

b) Mount the S2 sensor (if used):

- do not immerse the sensor into any liquid nor install it within chimney flue gas stream
- depending on the selected layout install the sensor on the heat buffer/DWH tank
- using a hose clip tighten the sensor to its pipe.

c) Connect additional heat source controller:

- unplug additional heat source controller from its power supply
- link E11K controller box with alternative heat source controller box using at least 2 x 0.75 mm^2 braided cord
- connect a cable to the **AUX** output **COM** and **NC** or **NO** terminals of the E11K controller (depending on the type of the alternative heat source)
- connect the cable to the alternative heat source controller.

d) Connect room thermostat:

- the controller may cooperate exclusively with room thermostats equipped with voltage-free normally open (NO) output contacts
- link E11K controller box with room thermostat box (or its receiver in case of a wireless remote control) using at least 2 x 0.75 mm^2 braided cord
- connect a cable to the **RT** terminals of the E11K controller
- connect the cable to the **COM** and **NO** thermostat terminals.

e) Connect pumps/throttle actuator:

- connect blue wire to the **N** terminal
- connect brown wire to the **L** terminal
- pumps must be hooked up to the **P1-P3** controller terminals, respectively
- throttle actuator must be hooked up to the **throttle** output **N** and **L-open** or **L-close** controller terminals (depending on the type of the throttle)

ATTENTION The controller may cooperate exclusively with a bi-state throttle actuated by a 230 VAC actuator. In absence of power the throttle should close automatically.

- connect protective wires of the pumps and of the throttle with the PE power cord wire.

ATTENTION Controller is a 2nd insulation class device, so it needs no grounding. However, every cooperating device that needs to be grounded must be obligatorily connected to the protective wire.

f) Hook up power supply cable:

- connect neutral (blue) wire to the **N** terminal
- connect live (brown) wire to the **L** terminal.

g) Verify the connections:

- check up all cable connections and tighten the terminal box lids.

h) Mount the controller:

- carefully put the controller board into its box, fix the box, and put the front cover on.

4. OPERATION

a) Turning the controller on/off

Press the button to turn the controller on. Firmware version number is displayed, the **ANTY-STOP** function is executed for 30 s, then the device resumes normal operation.
Press and hold the button for 2 seconds to turn the controller off. Device screen turns blank (only the light remains lit) and the throttle closes so that the fireplace goes out. Control algorithms will continue to run in order to fully utilize the produced heat and to provide fireplace safety.
The controller turns off automatically if the water jacket temperature exceeds the put-out temperature. The function is active if the **On** installer parameter has been set to 1. If the parameter has been set to 0, the controller will not turn off until the temperature exceeds the

warning (critical) temperature.
The controller also turns off automatically should the fireplace went out. It will happen after the time (in minutes) set as the value of the **OF** installer parameter. If the parameter is set to 0, automatic controller shut down is disabled.

b) Reading states of outputs and temperatures

Activation of a controller output is signaled by front panel light assigned to that output, see description in the VISIBLE CONTROLLER ELEMENTS section above. By default, the S1 sensor temperature is displayed on the controller screen. Press the button to display the other sensor reading (if the S2 sensor is available in the system). At any time the and lights signal which sensor temperature is currently displayed (S1 or S2). Temperatures lower than 0°C are displayed as **LO**, temperatures higher than 99°C are displayed as **Hi**.

c) Throttle control

The controller opens the throttle if fireplace jacket water temperature is too low, and closes the throttle if the temperature approaches the jacket preset temperature. The preset depends both on user settings and on room thermostat (**RT**) signal:

- If the **RT** input is short-circuited, the temperature set as the **throttle** user parameter value is maintained
- If the **RT** input is open, the temperature set as the **tb** installer parameter value is maintained.

d) Ignition

The ignition function consists in keeping the throttle open until the fireplace gets lighted as signaled by increase of the fireplace temperature above the put-out threshold (defined as the **tE** installer parameter value). Should that not happen within 1 hour, the controller will cancel the ignition function and close the throttle. Otherwise it will resume normal operation.
Activation of the ignition function is signaled by the light. The function is activated automatically once the controller is turned on. It may also be activated manually using the button. Press the button to deactivate the ignition function.

e) Cooperation with room thermostats/alternative heat sources

Controller may cooperate with a room thermostat and an alternative heat source (e.g. a gas-fired boiler). To that end it is equipped with the **RT** input for signals from the room thermostat and the **AUX** output to control the alternative heat source.
If voltage-free contacts hooked up to the **RT** input are closed, fireplace is heated up to the preset throttle activation temperature and the CH pump is turned on. Should the contacts become open, fireplace temperature will be lowered to the preset standby temperature, and the CH pump will be turned off (provided that is possible in the given system layout). Surplus of the produced heat will be stored in the CH tank.

ATTENTION Only room thermostats equipped with voltage-free output contacts may be hooked up to the RT input of the controller.

To turn the alternative heat source on, the controller closes the **COM** and **NO** contacts of the **AUX** output, which is signaled by the light. Contacts of the **AUX** output are voltage-free. The alternative heat source is turned off when:

- the fire-place is hot
- the **RT** input is open.

Provided that power supply is present, state of the **AUX** controller output does not depend on the controller mode of operation, including controller shut-down. Besides, the normally closed **AUX** output contacts enable operation of the alternative heat source even if the E11K

controller/its sensor fails or in case of a power supply black out.

f) Detection of sensor failures and other dangerous situations

Following events are recognized by the controller:

Event	On screen	Pumps	AUX output	Acoustic signal
Sensor open Deep freeze	**OP**	on	on	no
Freezing	**LO**	off	in line with the control algorithm	no
Critical temperature exceeded	Temperature	on	off	no
Alarm temperature exceeded	Temperature	on	off	yes
Overheating	**Hi**	on	off	yes
Sensor short-circuited Strong overheating	**SH**	on	on	yes

Each of the above events:

- cancels ignition function (if activated)
- starts to blink controller screen contents.

In case of a single error of the S1/S2 sensor, the light is lit, respectively. In case of more than one simultaneous errors, only the highest priority error is signaled. Error priorities:

- S1 sensor failed (**SH** or **OP**)
- S2 sensor failed (**SH** or **OP**)
- S1 sensor overheated or frozen (**LO** or **Hi**)
- S2 sensor overheated or frozen (**LO** or **Hi**)
- S1 sensor temperature too high
- S2 sensor temperature too high.

g) Alarm output (optional)

In case of an alarm all pump outputs (including outputs not used in the given system layout) are activated. It means that each unused pump output may be used as an alarm signal.
The **P3** output is equipped with both normally open (NO) and normally closed (NC) contacts. In case of an alarm, mains voltage normally connected to the NC contact is switched over to the NO contact.

h) Acoustic alarm

Should the fireplace water jacket/CH tank temperature exceed the alarm threshold, an acoustic alarm signal is activated. Press any button to stop the signal for 5 minutes.

i) The ANTY-STOP function

The **ANTY-STOP** function turns the CH system pump(s) on every 14 days for 30 s (to prevent rotor seizing). "AS" letters are blinking on the controller display while the function is active.

j) DWH priority

In CH systems with DWH tanks the DWH function may be assigned a higher priority than the CH function. If this is the case, the controller will turn the CH system off should heating of DHW be needed (to shorten time necessary to heat the DHW tank up). A modified DHW priority function implemented in E11K controllers prevents room temperature to drop down too much while the DHW tank is heated: every now and then (preset period) the function is turned off for 10 minutes so that the CH pump may be turned on for that time.
The DHW function period may be set as the **Pr** installer parameter value. For example if **Pr** = 30, the DWH priority function will be suspended and the CH pump turned on every 30 minutes (for 10 minutes). The **Pr** = 0 value disables the DWH priority function, which means that the CH pump will operate regardless of the DHW tank temperature.

k) Relay activation delay

To increase lifetime of the controller output relays, outputs are prevented against activating/ deactivating more frequently than once per second. However, lights signaling state of the relays go on/off without any delay.

l) Output tests

The **t1, t2, t3, tP, Ta** installer parameters may be used to manually turn on/off the **P1, P2, P3** pumps, throttle, and **AUX** outputs, respectively (to test them).

5. SETUP

a) User parameters

User parameters are system settings (temperature presets) that may be modified by the user. Use the button to sequentially display preset temperature thresholds at which P1/P2/P3 pump, throttle, and **AUX** output are activated (press the button to display next preset). Use the and buttons to modify the displayed value. Each modification must be confirmed with the button or else the controller cancels it after 10 seconds. Use the button to cancel errors.
Only user parameters used in the given system layout are displayed, those not used are hidden. User parameters include:

- **P1** Temperature at which the P1 pump is engaged. Range: 20÷85°C. Standard value: 40°C.
- **P2** Temperature at which the P2 pump is engaged. Range: 20÷85°C. Standard value: 40°C. Only for layouts 2 and 3.
- **P3** Temperature at which the P3 pump is engaged. Range: 20÷85°C. Standard value: 45°C. Only for layouts 2 and 3.
- **THROTTLE** Preset fireplace temperature (throttle activation threshold). Range: (20 or **tb**)÷(70 or **OH**–5°C). Standard value: 55°C.
- **AUX** Temperature at which the **AUX** output is deactivated. Range: 20÷85°C. Standard value: 35°C.

b) Installer parameters (service mode settings)

ATTENTION Installer parameters must be modified knowledgeably or else the CH system may start to work incorrectly. Therefore the parameters should be modified exclusively by a qualified installer/serviceman.

Simultaneously press and hold the and buttons to enter the service setup mode. Code (symbol) of the first installer parameter is displayed. Use the and buttons to display other parameters. Use the button to display current value of the displayed parameter. Use the and buttons to modify the displayed value. Each modification must be confirmed with the button or else the controller will cancel it after 1 minute. Use the button to cancel errors.
Installer parameters (system settings that should be modified only by a qualified installer/serviceman) include:

- **H1** **P1** threshold hysteresis (i.e. difference between temperature at which the P1 pump is engaged and temperature at which the pump is disengaged). Range: 1÷10°C. Standard value: 5°C.
- **H2** **P2** threshold hysteresis. Range: 1÷10°C. Standard value: 5°C.
- **H3** **P3** threshold hysteresis. Range: 1÷10°C. Standard value: 5°C.
- **HP** Throttle threshold hysteresis. Range: 1÷10°C. Standard value: 5°C.
- **HA** **AUX** output threshold hysteresis. Range: 1÷10°C. Standard value: 5°C.
- **tE** Put-out temperature. Range: 30÷(40 or **tb**–10)°C. Standard value: 30°C.

Controller treats the fireplace as shut down and closes its throttle if the fireplace temperature has dropped down below **tE**. On the other hand the controller resumes normal operation after the ignition phase as soon as the temperature has risen above **tE**. If the put-out temperature is set too high, the fireplace might be put out by the controller. If the put-out temperature is set too low, the throttle might be opened unnecessarily.

- **tb** Standby temperature. Range: 40÷(60 or **OH**-5)°C. Standard value: 45°C. Controller maintains that temperature while there is no demand for heat. The parameter should be set for a minimum temperature at which fire at the fireplace can be sustained.
- **OH** Critical temperature. Range: 60÷(90 or **AL**-1)°C. Standard value: 80°C. As soon as the fireplace temperature has exceeded that threshold, the controller starts emergency cool down procedure: throttle is closed and all available pumps are engaged.
- **AL** Alarm temperature. Range: 85÷95°C. Standard value: 90°C. Should the fireplace temperature exceed that threshold, acoustic warning signal is activated.
- **dF** Minimum difference between temperature of the fireplace and temperature of the CH tank/buffer at which the tank/buffer is loaded. Range: 1÷20°C. Standard value: 5°C.
- **On** Automatic controller activation. Range: 0÷1. Standard value: 1.
  On=0: the controller will not activate until the fireplace temperature rises above the **OH** threshold.
  On=1: the controller will activate as soon as the fireplace temperature exceeds the **tE** threshold.
- **OF** Automatic shut-down delay. Range: 0÷30 min. Standard value: 5 min. The controller will shut down automatically **OF** minutes after the time when the fireplace temperature has dropped down below the **tE** threshold.
  OF=0: the controller will never shut down automatically.
- **C1** S1 sensor offset. Range: -5÷5°C. Standard value: 0°C. That parameter may be used to correct temperature readings.
- **C2** S2 sensor offset. Range: -5÷5°C. Standard value: 0°C.
- **SC** CH system layout. Range: 1÷3. Standard value: 1.
  SC=1: heat exchanger, 2 pumps (the simplest layout)
  SC=2: heat buffer, 2 pumps
  SC=3: DWH tank, heat exchanger, 3 pumps.
  See detailed description in the SYSTEM LAYOUT section below.
- **Pr** DHW priority suspend period. Range: 0÷90 min. Standard value: 0 min.
  Pr=0: DHW priority disabled, CH and DHW pumps operate independently.
  Pr=30/60/90: DWH priority function will be suspended and the CH pump turned on every 30/60/90 minutes for 10 minutes to prevent room temperature against dropping down too much while the DHW tank is heated.
- **t1** P1 output state. Range: 0÷1.
  t1 = 0: the output is inactive
  t1 = 1: the output is activated
- **t2** **P2** output state. Range: 0÷1
- **t3** **P3** output state. Range: 0÷1
- **tP** **THROTTLE** output state. Range: 0÷1
- **tA** **AUX** output state. Range: 0÷1

c) Automatic verification of settings

The controller verifies the entered presets and automatically corrects settings which would prevent its correct operation. This is accomplished two ways:

- If the modified setting is a key parameter on which other less important parameters depend, the entered modification automatically forces respective modification of all dependent parameters. For example, if the alarm temperature is lowered, throttle activation temperature is also automatically lowered.

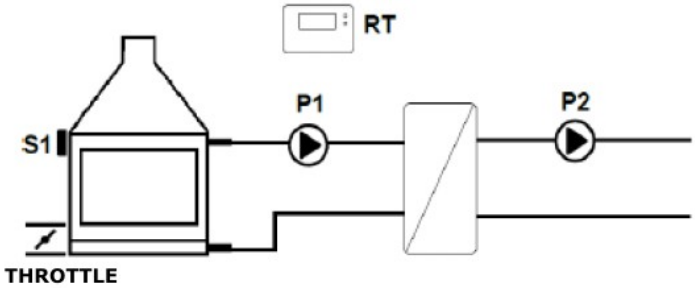
- If the modified setting depends on another more important (key) parameter, the system will prevent any incorrect modification. For example, the throttle activation temperature may not be set higher than the alarm temperature.

6. SYSTEM LAYOUTS

Use the **SC** service parameter to select the actual system layout. The below shown diagrams are simplified, not all elements necessary for correct operation of the system are shown.
Legend:

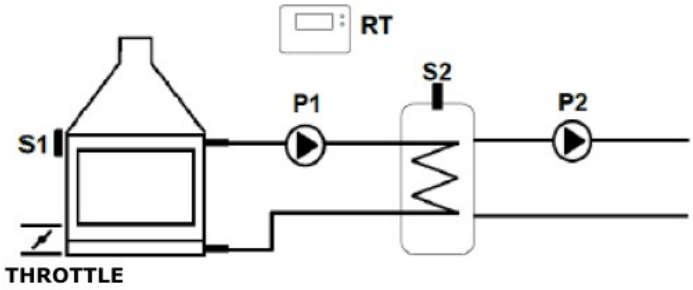
S1, S2	1st/2nd temperature sensor
RT	room thermostat
P1, P2, P3	1st/2nd/3rd pump
THROTTLE	combustion air throttle

a) Layout 1: CH system with plate heat exchanger



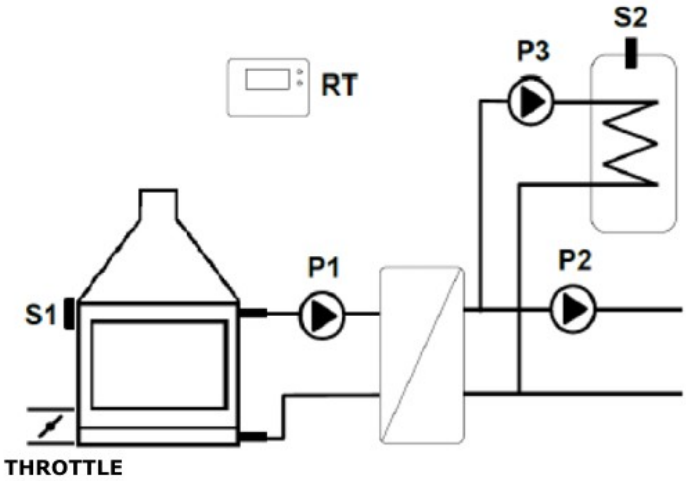
- **P1** pump is activated if the fireplace temperature exceeds the preset temperature
- **P2** pump is activated with a delay in respect to P1 activation time if the fireplace temperature exceeds the preset temperature
- **P3** alarm output is activated if the fireplace temperature exceeds the critical temperature
- **AUX** output is deactivated if the fireplace temperature exceeds the **AUX** temperature or **RT** is turned off
- Throttle is controlled (open/closed) to maintain the preset temperature.

b) Layout 2: CH system with heat buffer



- **P1** pump is activated if the fireplace temperature exceeds the preset temperature and is sufficiently higher than the heat buffer temperature
- **P2** pump is activated if the buffer temperature exceeds the preset temperature and the **RT** signal is ON
- **P3** alarm output is activated if the fireplace temperature exceeds the critical temperature
- **AUX** output is deactivated if the heat buffer temperature exceeds the **AUX** temperature or **RT** is turned off
- Throttle is controlled (open/closed) to maintain the preset temperature.

c) Layout 3 : CH system with plate heat exchanger and DWH tank



ATTENTION Since in the 3rd layout heat surplus is transferred to the DWH tank, temperature of water in that tank may theoretically reach the critical threshold (as preset by the OH installer parameter value).

- **P1** pump is activated if the fireplace temperature exceeds the preset temperature
- **P2** pump is activated if the fireplace temperature exceeds the preset temperature and the **RT** signal is ON and the DWH priority is not active
- **P3** pump is activated if the tank temperature drops down and the fireplace temperature is sufficiently higher than the tank temperature
- **AUX** output is deactivated if the fireplace temperature exceeds the **AUX** temperature or **RT** is turned off
- Throttle is controlled (open/closed) to maintain the preset temperature.

7. COMPATIBILITY WITH STANDARDS AND CERTIFICATES

The E11K controller meets all requirements of the EMC and the LVD EU Directives. The CE Conformity Declaration is available on the http://www.euroster.com.pl Internet webpage.

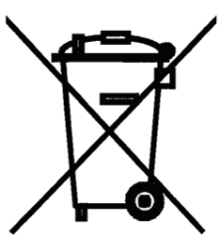
8. SPECIFICATIONS

a)	Temperature range	0°C – 99°C
b)	Mains	230 V 50 Hz
c)	Combined current consumption	max. 3 A
d)	Case	flush-fitting 4M electrical box

4. KIT CONTENTS

a) Euroster 11K controller
b) S1 temperature sensor with 2 m long silicone-insulated cable
c) S2 temperature sensor with 2.5 m long cable
d) sensor hose clips
e) this Installation & Operation Manual

ELECTRONIC WASTE MANAGEMENT INFORMATION



We made every effort to get as long controller lifetime as possible. However, the device is subject to natural tear and wear. We ask you to have a controller that will not meet your requirements any more brought into an electronic waste management facility. Electronic waste is collected free of charge by local distributors of electronic equipment.

Inappropriate management of electronic waste may lead to an unnecessary environment pollution.

Cardboard boxes should be disposed of at a paper recycling facility.

GUARANTEE CERTIFICATE

EUROSTER 11K

Warranty terms:

1. Warranty is valid for 24 months from the controller sale date.
2. Claimed controller together with this warranty certificate must be supplied to the seller.
3. Warranty claims shall be processed within 14 business days from the date the manufacturer has received the claimed device.
4. Controller may be repaired exclusively by the manufacturer or by other party clearly authorized by the manufacturer.
5. Warranty becomes invalidated in case of any mechanical damage, incorrect operation and/or making any repairs by unauthorized persons.
6. This consumer warranty does not exclude, restrict nor suspend any right of the Buyer ensuing if the product would not meet any of the sale contract terms.

…….....

sale date serial number/date of manufacture signature/stamp

Business entity that issued this warranty certificate:
P.H.P.U. AS Agnieszka Szymańska-Kaczyńska, Chumiętki 4, 63-840 Krobia, Poland